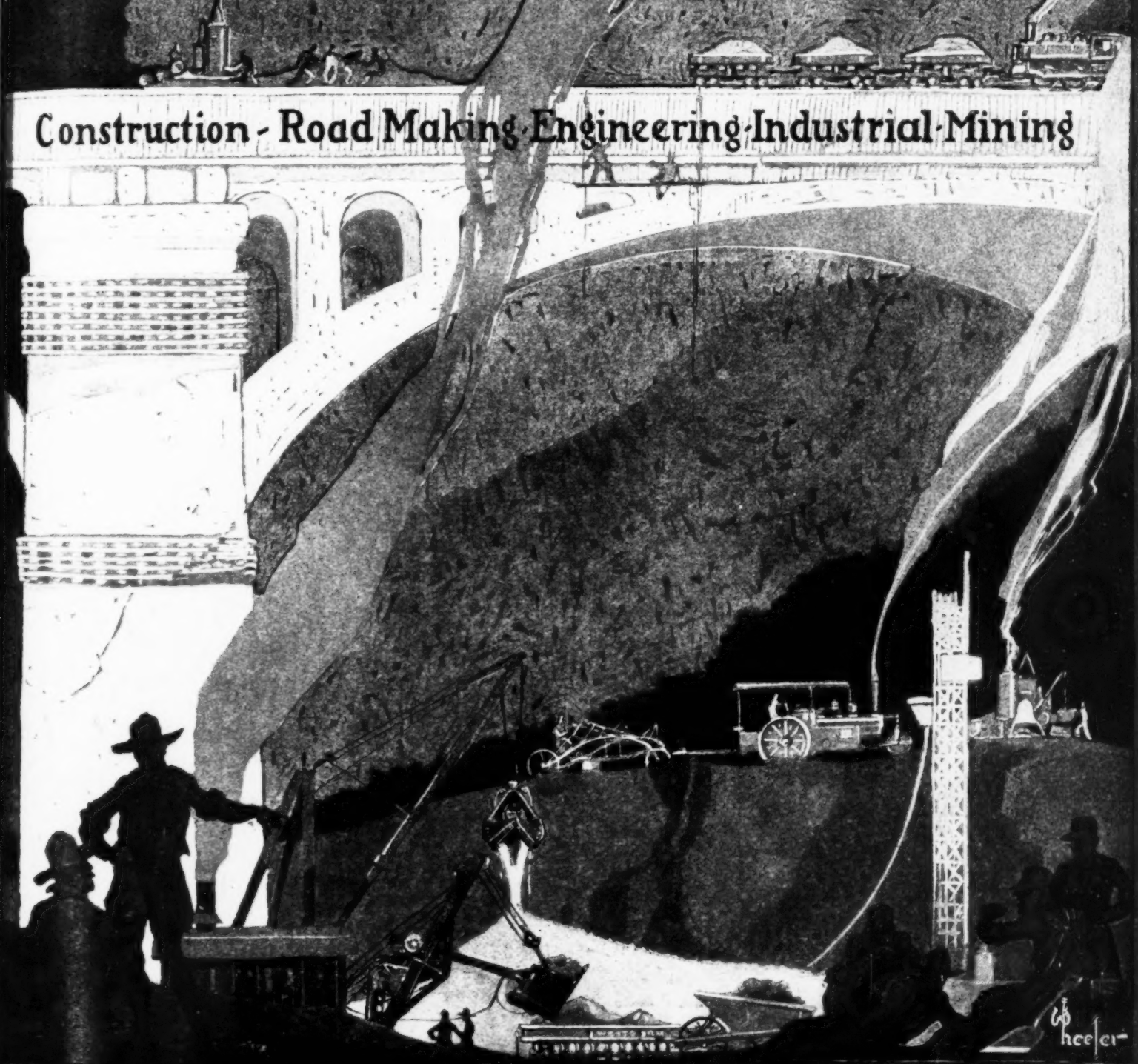


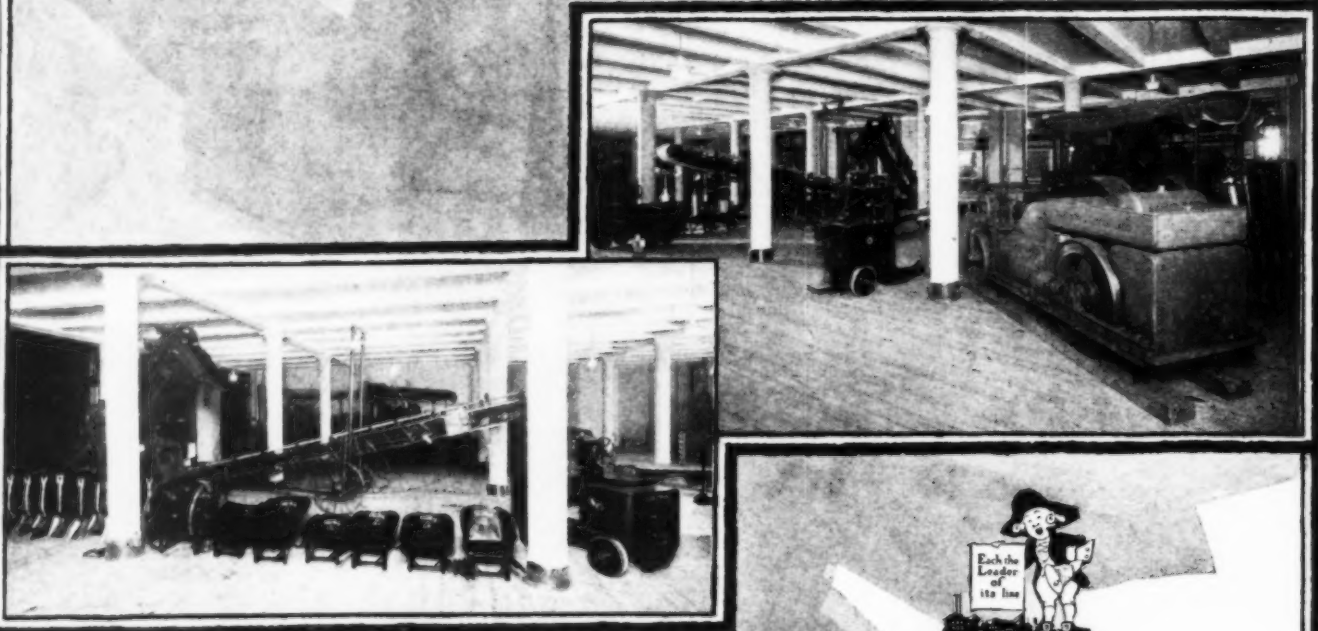
# Successful Methods

Construction - Road Making - Engineering - Industrial - Mining



Whoop'er-Up!

# ALLIED MACHINERY CENTRE



## CORNER WALKER AND CENTRE STREETS NEW YORK CITY

*Where information concerning the work done by the machines of the following manufacturers may be obtained readily and conveniently.*

**Austin Manufacturing Co.**

Street and Road-Making and Maintenance Machinery.

**Barber-Greene Co.**

Portable Conveyors and Self-Feeding Bucket Loaders.

**Carbic Mfg. Co.**

Acetylene Lights, Welding and Cutting Equipment.

**C. H. & E. Mfg. Co.**

Gas Engines, Mortar Mixers, Material Elevators, Pumps, Saw Rigs.

**Clyde Iron Works**

Hoists, Derricks and Equipment.

**The Lakewood Engineering Co.**

Industrial Haulage Systems, Concrete Construction Plants and Accessories.

**The Parsons Co.**

Trench Excavators and Back Fillers.

**A. B. Farquhar Co., Ltd.**

Portable, Semi-Portable and Stationary Steam Engines and Tractors.

**Sterling Wheelbarrow Co**

Wheelbarrows.

**Wyoming Shovel Works**

The "Red Edge" Hand Shovels.

**Western Wheeled Scraper Co.**

Earth and Stone Handling Machinery.



# Successful Methods

*A Magazine of Construction Service*

Published by  
**MANUFACTURERS PUBLICITY BUREAU**  
INCORPORATED  
140 South Dearborn Street, Chicago.

Vol. II

May, 1920

No. 5

## WHOOOP 'ER UP!

Everybody is busy these days. Every contractor worthy of the name has more work than he can do. What's the use of making a big noise and whooping things up?

That seems like a reasonable question. Everybody *is* busy; there *is* plenty of work; everywhere you look you see a building going up, a road being made, some form of construction work in full blast.

But that is precisely the reason for whooping things up, for adding the stimulus of vocal encouragement. Plenty of work is an inadequate expression. There is more than plenty of work; there is an abundance of work; more than can be done with the available supply of men, materials and machines.

The man who slows down on the job he is doing because he knows there is another waiting for him when he gets through is cheating himself as well as cheating those who want the work done speedily. For, after all, the people as a whole are waiting for the nation's construction work to catch up with the program.

The whole construction world took a vacation during the war and it couldn't afford a vacation. As a result, people are demanding more houses, more roads, more factories in which to make the things they need, and they are demanding them at once. They refuse to wait.

That is why Successful Methods cries "Whoop 'er Up!" at a time when everyone is busy. Don't let your enthusiasm flag. Don't slow down a minute. Whoop 'er Up all along the line. Keep things moving. Let's catch up!

*This Magazine Will Be Sent To Men Who Can Use It.  
This Issue Has More Than 75,000 Circulation.*

## EDITORIALS

### Why Railroad Cars?

**F**OR what purpose are railroad cars?

What's that you say? Foolish question No. 6413?

Perhaps to the thinking man it is a foolish question, for everyone will concede that the business of railroad cars is to transport material from here to there, but when one considers how many cars are used for storage purposes and the time that is consumed in loading and unloading these cars, one will realize that the question asked is not so foolish, after all.

Everyone knows that the crying need of the railroad is cars. If modern methods were employed in loading and unloading cars, the number of cars released from acting as warehouses and storage bins would considerably increase the number of cars available for their real function—that of transporting material from here to there.

### Which?

**T**HE gold on one side and the silver on the other of the shield carried by a Roman god, was the cause of many a heated argument because of the proclivity of human nature to look on only one side of the shield, for this failing was prevalent even in the days of the Roman empire.

We hear much these days of the statement in regard to bidding for highway work, "the contractor's price is too high." The phrase "too high" is a comparative one. What is the basis of comparison?

It would appear that the basis of comparison is the engineer's estimates. Are these estimates infallible? Might it not be that these estimates are too low?

This discussion is somewhat akin to that of a friend of ours who came into the city last week and said: "I am going to buy myself a pair of \$3.50 shoes." He stopped in the first shop and announced his purpose, but found that the shoes he wanted would cost him \$12. Exit, with a frown—and he spent all that morning in sole-agonizing search of the \$3.50 shoes that he had been accustomed to buying.

Conditions had changed. In fact, everything had changed, but he had refused to reconcile his idea of cost to the present day conditions.

### Send Back the Sacks

**W**HAT do you do with your cement sacks after you have emptied them? Do you throw them away, use them to keep odds and ends in, or do you do what you ought to do with them?

No contractor needs to be told that there is a shortage of materials of almost every kind. The material of which these sacks are made is suffering from the shortage disease, too. The cement manufacturers can't get enough sacks to put the cement in when they finish making it. So anxious are they to renew their supply that they redeem all sacks returned by contractors. And yet some contractors throw these sacks away and then wonder why the cement mills are so slow in their deliveries.

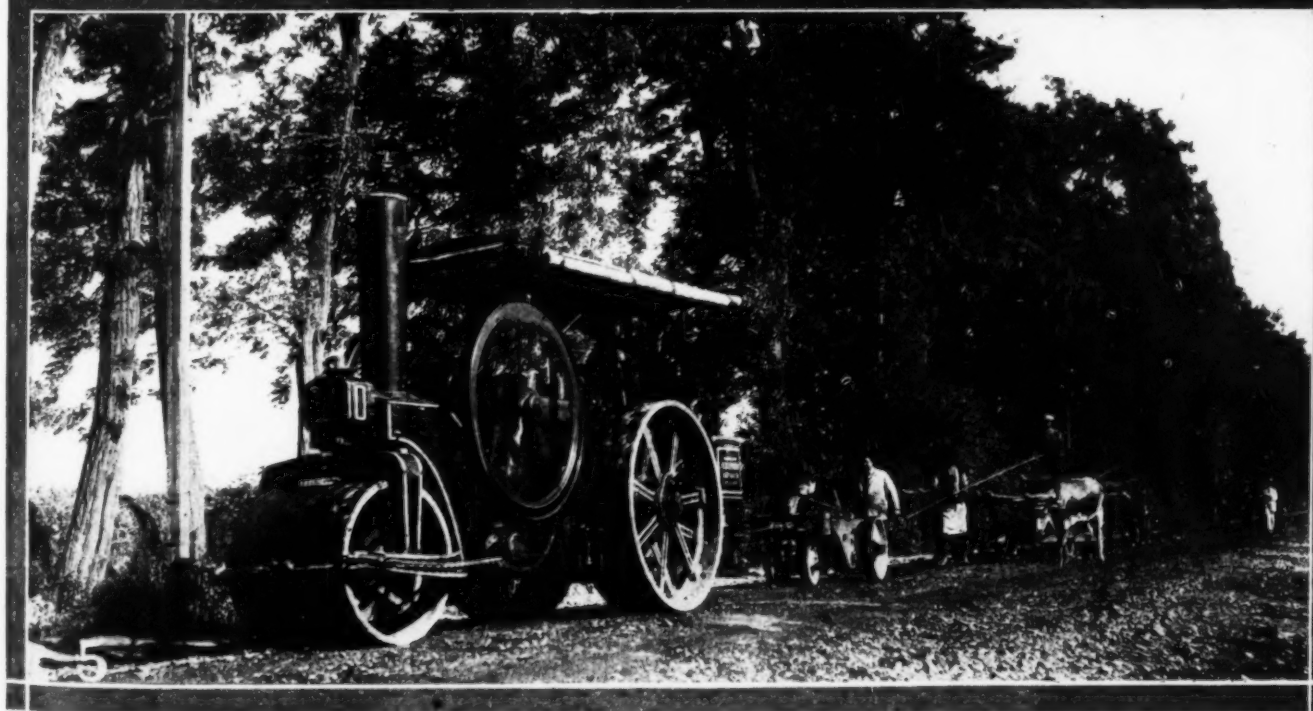
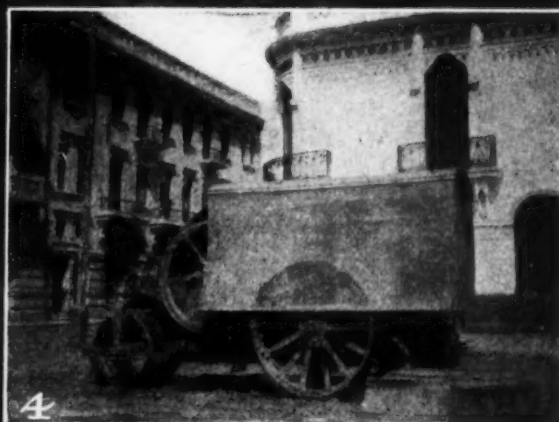
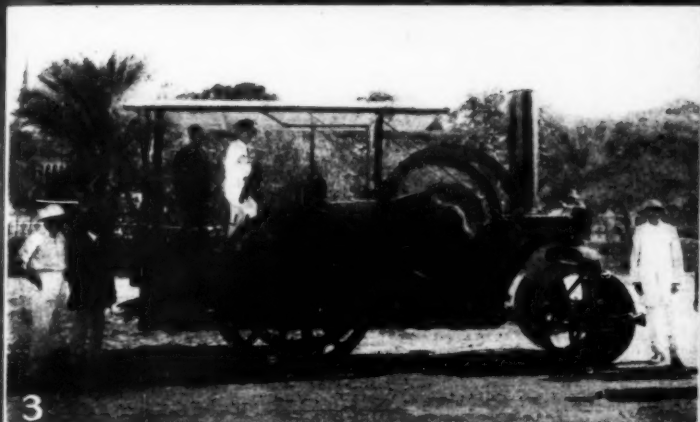
Return your sacks to the manufacturer. You will get real money for them, and, better yet, you will help the mills to keep things moving, which is what you want.

### Get Those Cars Unloaded Quickly





## ROLLING ROADS 'ROUND THE WORLD



1—On a Concrete Road Job. Smoothing Down the Subgrade. 2—A Small Motor Roller at Work in a City Street. 3—On the Other Side of the World; an American Roller in India. 4—In Lima, Peru. 5—Its First Job on Chilean Soil; a Steam Roller from the States Settles Down to Work Near Santiago.

## CONSTRUCTION AT HOME

At the right—Wisconsin contractor moves a 90-ton house with a 3-ton truck.

Below—Testing a concrete pipe down in Oklahoma.



Above—Hard at work on the excavation for Chicago's new Union Station.

At the Left—A 6-wheeled truck which permits the use of smaller tires and makes it possible to carry heavy loads without the usual wear and tear on the roads.

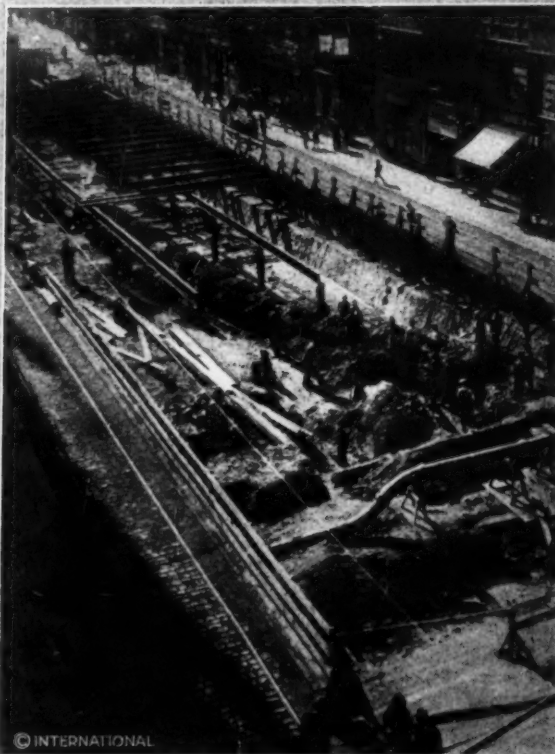


## AND BEYOND THE SEAS



At the Left—Where East meets West  
—An American concrete mixer ready for  
work a half hour after it was uncrated in  
an Indian town.

Below—Subway building in Berlin.



Above—Easy-going methods of  
hauling building supplies still pre-  
vail in Madrid.

At the right—A new use for  
German Helmets—Paving a road  
with captured headgear.





## ROAD MAKING AND MONEY MAKING

The Contractors Begin to Make Themselves Heard on This Important Subject.

(In the last two issues of *Successful Methods*, the state engineers gave their opinions. Now it is the turn of the other side. A number of letters from different parts of the country are printed on this and the next three pages.)

### Hoosier Hazards

#### Highway Work in Indiana Isn't Exactly a Bed of Roses for the Contractor

FROM a contractor reader in Indiana comes a summing up of the situation in that state which makes interesting reading. Laws, laws and then more laws confront the contractor who tackles a road job in Indiana, and by the time each and every requirement is fulfilled the construction season is likely to be over.

In these days when contractors are so often blamed for not getting on the job promptly, it is distressing to read of a good live firm with its material and equipment all ready for work, held up by the slow-moving legal machinery of Indiana. The people of Indiana want roads and want them at once. What are they going to do about it?

Our Hoosier contractor's letter:  
Editor *SUCCESSFUL METHODS*,  
Dear Sir:

We are interested readers of *SUCCESSFUL METHODS* and appreciate greatly the work already accomplished in the matter of bringing the engineer and contractor into closer relations.

We welcome the opportunity granted us of giving our views as to the betterment of highway construction conditions in our state, and if we can in any manner assist in straightening out the matters at present affecting contractors and communities desiring to carry on a road program, we will be only too ready to do anything asked of us.

At the present time, highway law in this state is in a chaotic condition. Under its operation the hands of the state commission, county officials and contractors are effectually tied, and it is almost a certainty that the extensive plans for highway development will shrink to nothing unless remedial legislation is speedily effected.

I can best give you an understanding of our problem by citing our personal experience. Our company specializes in the construction of concrete highways, though equipped for asphaltic concrete, penetration, stone and gravel types of construction and actually engaged in some gravel construction at the present time.

On the dates listed below we were awarded contracts for the construction of concrete highways in Wabash county, Indiana, as follows:

January 3, 1920, Light Harness Pike.....	\$ 86,690
Ben Coble Road.....	64,780
March 6, 1920, Albert Bechtold Road.....	63,770
(Above roads under three-mile road law.)	
February 6, 1920, Vernon Pike.....	439,000
(Under county unit road law.)	

Immediately upon receiving the award of these contracts we entered our order for all materials necessary to their construction, and also for additional equipment.

Under Indiana law as applied by our state tax commission, the bond issues for these projects must receive their approval, and in the first two jobs this approval was granted on March 1st. For the latter two, approval has not been granted at this date, the county unit road law being now in the hands of the state supreme court awaiting its decision as to its constitutionality.

Immediately upon receiving the approval of the tax commission the bonds for the first two projects were advertised for sale, the date of sale being March 29th, approximately three months after the awarding of the contracts.

The bonds under the three-mile road law are non-taxable and bear interest at 4½ per cent, but under the county unit road law the bonds bear 5 per cent interest.

At the time of bidding upon these jobs 4½ per cent bonds could be handled at a discount of from 2 per cent to 3 per cent, and under the estimate for construction of the road we were enabled to include that sum for their disposal in our bid and leave a fair margin of profit upon the job, and we did so. However, due to the extreme delay in the sale of these bonds and their lack of availability for delivery, they have depreciated in value, according to bond houses to the extent that they now ask a premium of 7 per cent to 8 per cent for the handling of same.

This price precludes all possibility of the contractor handling the bonds under his bid price, and our three-mile road law prescribes that the county cannot sell these bonds for less than par.

Not anticipating the delay that actually occurred, and desiring to be prepared to begin the season early and insure the completion of these projects in good time, which we take it, is the duty of the contractor whenever possible to do so, we ordered shipment of our materials and they are now actually upon the ground entailing an expenditure of thousands of dollars.

Unless we can enlist the aid of remedial legislation, we cannot proceed with

these contracts for the reason that the cash fund for their construction has not been created, due to failure of the bonds to sell, and our program, which had such an auspicious beginning and roseate prospects, is doomed to dismal failure and considerable financial loss on our part. I might add that not being quitters, we are continuing with our work on these projects and will do so as long as we can possibly carry the burden, relying upon the recognized fairmindedness of the communities interested and their officials to aid us in carrying on.

Upon our large contract, under the county unit road law, we have been unable to do anything while awaiting the decision of the supreme court, but the delay will occasion us considerable financial loss inasmuch as we are forced to cancel our contracts for equipment ordered for this work and will have to repurchase at greatly increased prices when we are enabled to proceed with construction, which may be in one week or in two years.

The condition outlined above is not alone peculiar to ourselves. The writer knows of numbers of contracts now awarded at a price which precludes the possibility of paying any bond premium whatsoever, and which will have to be given up by the contractors, re-estimated and re-let at a much higher price, entailing considerable loss to the taxpayers of the communities involved. It is safe to say that 80 per cent of the work now under contract in this state upon which the bonds have not been disposed of will be given up and re-let unless conditions are rendered more favorable by legislation.

The writer has talked to numerous financial men throughout the state who have stated that there is no real reason for asking such excessive prices for the handling of this class of bonds, and one representative of an Indiana bond house in asking a quotation on these bonds has stated to the writer that they were all forced to raise their price of handling same, due to the fact that one firm went wild



ROLLED SUBGRADE WITH FORMS IN PLACE ON FEDERAL AID CONCRETE HIGHWAY IN INDIANA

and offered these securities at a tremendously low price. He further stated that our firm was correct in figuring at 3 per cent for their disposal in January, as they could have been handled at that price at that time.

In correction of this condition outlined above, which is prejudicial to the best interests of not alone the contractor, but the taxpayer as well, we ask constructive remedial legislation clarifying the county unit road law and legalizing all projects upon which expense has been created under the law to date; the amending of the three-mile road law, enabling the counties to share with the contractor the expense of disposal of bonds on contracts awarded which can be done by a proper interpretation of section 1, chapter 191, page 554, Acts of 1913, dealing with preliminary expense of highways; and the further amending of said three-mile road law by providing that before a contract is awarded that the funds must be created in the treasurer's office through the sale of the bonds issued for the construction of same; that the contractor be allowed upon estimate up to 80 per cent for all material actually delivered upon the ground for use in construction.

We predict that unless legislation of this type is enacted, the reputable contractors of this state will, in large numbers, be forced to seek other fields in pursuance of their business and that the State of Indiana will sacrifice her present enviable position in the forefront of states possessing large mileage of excellent highways.

We have further recommendations which we might add, but we are stating the remedies for only that which we know peculiarly well through having experienced the ills incident thereto. We know that contractors and engineers at present engaged in and contemplating bidding upon highway construction under the highway commission will state their case in detail.

We desire to state our opinion that the present conditions are no fault of the county officials, as their hands are tied by existing law, but rather to the haphazard method of considering highway legislation by our state legislature and the lack of a proper appreciation on their part in the past of the problems confronting boards of county commissioners, contractors and county engineers. Also to the fact that the power of approval of bond issues has been taken from the communities interested and vested in the state tax commission, who cannot properly judge in these matters, thus occasioning considerable delay and, in view of the present rising market, expense in the performance of contracts.

We have stated the circumstances of our present conditions in full detail in order that you might appreciate just how bad the position of ourselves and numerous other contractors is today. While we have contracts for the construction of some \$700,000 worth of highway, in a peculiar sense we have nothing, and the season is advancing with only effective work a gamble.

Thanking you for the opportunity presented us of unburdening ourselves, and assuring you of our deepest regard, we are,

Yours very truly,

J. C. O'CONNOR & SONS,

By Maurice P. O'Connor.

## Good News From Montana

Cooperation Really Means Something There, Says  
Great Falls Contractor

**P**ROFITING by the lessons learned in the past, both state highway officials and contractors are working together in Montana. That is the opinion of a contractor reader of SUCCESSFUL METHODS, who admits that in the old days contractors were not on the best of terms with the state highway officials. It is pleasing to find that the old spirit of distrust is disappearing. The letter:

Editor SUCCESSFUL METHODS,  
Dear Sir:

We think that cooperation is a big word, and that it preserves both the money and the disposition on the part of both the contractor and the engineer, which is sometimes neglected even in the work itself, and we think that both the engineer and the contractor concede the fact. We know that heretofore on public works principally, contractors as a rule have been under the suspicion at all times of the engineering department. At any rate, such is the view taken by contractors in general in the past.

It is now being rapidly removed, however, and in our own state at the present time the engineering department is more alive to the spirit of cooperation than it has ever been before, and this spirit is being rapidly recognized by the contractors, much to the benefit of both parties and the owner combined. We think that the engineers this year have made a big step toward the standard of fairness, and it must be met by the contractors more than half way if we expect the situation to improve further along these lines. The first step having been made, we are very optimistic regarding the future within this locality at least.

Yours very truly,

WHITE, BROWN & LEAHY,  
By R. J. White.

## Taking Him at His Word

New York Contractor Asks Commissioner Green to  
Improve on Predecessors

**W**HEN he wrote to SUCCESSFUL METHODS a month or two ago, Frederick S. Green, Commissioner of Highways in New York, said that in the past contractors in his state had been justified in being discontented. Then he went on to say that it was his intention to "give the contractor the benefit of every doubt" and stated that contractors would find conditions much improved.

Now comes a New York contractor-reader of SUCCESSFUL METHODS who has written a letter to the Commissioner and sent a copy to this magazine. He gives facts and figures to show that before Commissioner Green's advent road building in New York was an extra-hazardous occupation. He urges Commissioner Green to stand by



A TAMPING AND FINISHING MACHINE AT WORK ON A CONCRETE HIGHWAY JOB IN ONE OF THE MIDDLE WESTERN STATES. IT KEEPS RIGHT AT THE HEELS OF THE MIXER



his promise to give the contractor the benefit of the doubt, and puts his case in plain and blunt language. It is a letter well worth reading:

Mr. Frederick S. Green,  
Commissioner of Highways,  
Albany, N. Y.

My Dear Sir:

In glancing over a magazine entitled "Successful Methods," I noticed a letter from you as well as an excerpt from a circular sent to all city officials, and I presume to all contractors.

In reading your letter I note that it is your intention to "give contractors the benefit of every doubt." I must say, that part of your letter is very interesting, for if you can show me, with a few exceptions, an engineer on a state highway that will give a contractor the benefit of a doubt, then you will show me the tenth wonder of the world. I have constructed highways in New York state and am now building highways in Pennsylvania. My experience in New York state just prior to and during the war cost me in the neighborhood of \$33,000 because of the inexperience of the men in charge of the work, because of their ignorance as to how the work should be done and because of their inability to fill the positions to which they were assigned.

During my entire experience, covering a period of about eight years on highways in New York, I met but one man, possibly two, that would give me or any other contractor the benefit of a doubt, even though conditions warranted him in doing so. The prices at which work was let were close enough, but a man that had the plant and knew how to do his work could just about get through with a very, very small percentage of profit if the engineer in charge would give him what he was entitled to.

It was a case of investigation after investigation, and every man in the employ of the state was afraid of his position. He was afraid to make his estimates out as they should be. He was afraid to classify the work as it should be classified to the extent that contractors did not know where they were at, and at the present time it is next to impossible to get a bank in the state of New York to loan a man on gilt-edge security a dollar to finance state highway work.

We finished the last highway we had at Ripley, in New York, about the time this country got into the war. For several months prior to that time men were leaving, and it was only by a continuous raise of wages from month to month that we were able to get a sufficient number of men from various towns as far east as New York City, and for whom we were compelled to pay their fares, that we were able to complete our contract. Our loss on that piece of work was \$15,500. We paid our men and paid our bills, but the great big liberal state of New York permitted about 125 contractors or more to go to the wall rather than make good their losses on account of conditions over which those contractors had no control.

Tell me, where are the old contractors that built highways and knew how to build them several years ago. Take it from me, they are all alive, but they are as much afraid to undertake the construction of highways in New York state as the devil is afraid of holy water, and if you can make contractors believe that they will receive fair treatment and that you will give them the benefit of the doubt, of every doubt, to quote your own words, you may perhaps be able to exercise influence enough to get some of them to return, but as I heard one say only a few days ago, "they never wish to touch work in New York state again."

I know of incidents where the engineer's estimates were made out by inexperienced engineers—by young men who merely guessed at the costs of material and at the rates of freight, etc., and presented the said estimates to the commissioner, who requested and, in fact, gave orders to the division engineer to cut the estimates down so that the amount of money between the estimate and the price bid by the contractor would not be held until the completion of a particular road. In all my experience, covering a period as engineer and contractor of over thirty-five years on railroads and highways, I never ran up against such a condition as I did in New York prior to your regime, and I hope I never will again. I am not prepared at this time to criticize Pennsylvania, but before the summer is over I may perhaps be able to do so.

I wish to say in conclusion, I note you try to get at the exact cost of the work, to which you add 20 per cent for overhead and profit. That is what I tried to do when I was bidding for highways in New York state, but never succeeded. There is so much work that a contractor cannot see,

and there is so much that engineers will exact that a 20 per cent profit will turn out to be a loss. Your intention may be very good. I have no doubt but what it is, and all I can say is that I hope it will work out all right for the poor, unfortunate contractor who is unfortunate enough to be in the highway game, and if I knew ten years ago what I know today about highways, and was not burdened with a large highway equipment, I would prefer selling peanuts on the corner rather than take a highway contract.

I trust that you will take this letter in the spirit in which it is written, for I have no feeling about it other than to give you my experience and the manner in which we were treated on the state highways by the great big munificent state of New York.

Yours very truly,

JOHN F. DOLAN CONSTRUCTION CO.,  
50 Church St.,  
New York City, N. Y.

## Not All Sunshine in Michigan

Where Do the Profits Go When the Price of Labor  
Jumps Overnight?

A MICHIGAN contractor who is strong for cooperation believes it should apply in cases where unforeseen difficulties arise. He doesn't believe that either a state engineer or a contractor is so nearly infallible that he can foresee everything at the time a contract is made. There is considerable truth in that view of the situation. The letter:

Editor SUCCESSFUL METHODS.

Dear Sir:

I received your April edition of SUCCESSFUL METHODS and was very much pleased with it. I should like very much to get your March number if you will please send it to me. The letters in the April number treating on fair profits and cooperation are a good thing and I believe a great amount of good can come from them. I am a road contractor, most of my work being county work, but I think the cooperation of engineers and contractors should be the same in either case. Also the profits.

I am not in favor of the cost plus plan. We have had too much of that in our army camps. But I think the contractor should receive a profit of from 10 to 15 per cent, according to the equipment he has to furnish. That should be net. Should unforeseen difficulties arise which the engineer or contractor was unable to figure on, I believe there should be cooperation sufficient to cover such extra expense.

The labor situation is as bad at present, I think, as the freight question and when the contractor figures on a job it is hard for him to tell what his labor is going to cost him. If he figures on present wages and when he starts construction, if wages have increased one dollar a day, say, on a job requiring 1,000 days labor, there goes \$1,000 of his profit. The path of the contractor is not all sunshine and he should have the cooperation of engineer and commission.

Yours truly,

GEORGE A. PARADINE,  
18 Clark Ave., Coldwater, Mich.

## The Young Inspector

A Little Scheme to Make the Contractor's Job More  
Difficult

FOR the good and sufficient reason that he is now engaged in completing some contracts in the state to which he refers, one of our contractor readers asks us not to print his name, and also requests that we omit the name of the state about which he writes. Perhaps some other contractor who has done business in that state will recognize it. The excerpt from his letter which we print is most illuminating on the subject of the engineers and inspectors who are employed on jobs in some states. Our reader says:

"We feel that it would be of some benefit to us if we could have your magazine mailed to these engineers regularly, thinking that the plan you are carrying out might change their views somewhat. We feel that most of the





A SKETCH OF THE FIRST FEDERAL AID PROJECT COMPLETED IN IOWA—CONCRETE ROAD IN CERRO GORDO COUNTY

trouble in road building is that the inspectors are young boys with no experience, and therefore, feel that they are expected to carry out every technicality in the specifications.

"To show you some of the ridiculous things that they request, a few days ago one of these inspectors instructed our superintendent to have a box made that would hold exactly one cubic foot, so that each bag of cement could be poured into this box and measured to see if it contained the exact quantity called for by the specification. You can see how ridiculous this would be, and can imagine how much concrete we could pour per day having to carefully measure each sack of cement. Of course, our superintendent being a man of a great deal of experience, refused to carry out these instructions and invited the inspector to stop the job, which of course he did not do."

### A Voice From Iowa

Says Highway Department Is Cooperating With  
Contractors in Every Possible Way

**T**HE Iowa Highway Commission comes in for a few words of praise from a newly-organized firm of contractors in that state. The letter says:

Editor SUCCESSFUL METHODS,

Dear Sir:

We are new contractors in the highway paving field who have only recently been awarded our first contract and hardly feel qualified to discuss intelligently your subject, "Cooperation Between State Highway Officials and Contractors."

However, we are able to say that the engineers of the Iowa highway commission have cooperated with us in every

possible way, and furthermore we believe that it is the purpose of this state highway commission to cooperate fully with contractors in making Iowa highway paving an attractive field.

Yours very truly,

BRERETON & BAUCK.  
By L. D. Brereton.

### From the Reclamation Service

**T**HE following letter commenting on an editorial which appeared in the April issue of SUCCESSFUL METHODS, shows that the Federal Government is well ahead of the game in many respects.

DEPARTMENT OF THE INTERIOR  
United States Reclamation Service  
St. Ignatius, Montana,  
April 13, 1920.

Editor, SUCCESSFUL METHODS,

Dear Sir:—I have read with interest the editorial in your issue of April, 1920, "Materials C. O. D."

It may interest you to know that the United States Reclamation Service has for many years made it a practice to pay for materials delivered on monthly estimates. This point is covered in the following standard paragraph which appears in practically all contracts for construction work:

"Progress Estimates and Payments.—At the end of each calendar month the engineer will make an approximate measurement of all work done and material delivered up to that date, classified according to items named in the contract, and will make an estimate of the value of the same on the basis of the unit prices named in the contract."

Very truly yours,

E. A. MORITZ,  
Project Manager.

### TO OUR CONTRACTOR READERS

The columns of Successful Methods always are open to its readers. In this issue a number of them set forth their views. There will be plenty of room for others next month. What about Georgia's new form of contract described on Pages 10 and 11? Would you like your state to adopt it?

## GEORGIA'S NEW CONTRACT FOR ROAD WORK

Payment Is Based on Unit Costs to Which Is Added a Fee for Contractor's Services.  
Both Parties Protected Against Loss

By W. R. NEEL,  
State Highway Engineer

**N**O state highway engineer or other official who knows his business has any desire to see a contractor fall down on a road job. That only means trouble for everyone concerned; trouble for the contractor, trouble for the county in which the road is being built, trouble for the state department which is supervising it, grief all along the line, and plenty of it, too. But the history of road building, in the last few years, especially, is filled with the names of contractors who have lost money in road work. Often the failure has been due to causes which were almost beyond the contractor's control. Unusually long spells of bad weather, unlooked-for scarcity of material or the cars in which to move it, a thousand and one reasons which are next to impossible to anticipate, may turn a profit into a loss.

Under the usual system of competitive bidding, the contractor has to take chances on these things. He has to name his total price in advance and stick to it, whether he wins or loses. Many a time it is nothing but a gambler's chance that he takes.

In an effort to protect the contractor, to get the work of road building closer to ordinary business methods, the Highway Department, State of Georgia, is working out a new form of contract, known officially as Form B. If it meets with the approval of all parties concerned it will be used this season and its workings will be closely observed. A description of Form B probably will be of interest to the readers of *SUCCESSFUL METHODS*.

Briefly stated, the contract provides for payment to the contractor on a basis of unit costs estimated by him in his bid to which he adds the amount which he expects to make as his profit. If the total cost of the work as constructed is less than the sum estimated, the contractor will receive 25% of the difference between the actual cost and the estimated cost, such payment, however, not to exceed 50% of the sum originally estimated as his profit.

On the other hand—and here is the feature which protects the contractor—if the actual cost exceeds the estimated cost, 25% of such excess cost shall be deducted from the sum originally estimated as profit, but this 25%

shall not exceed 50% of the contractor's estimated profit. He still has half of his profit in any case.

The following examples show how the new system will work for certain sums:

If a contractor's estimate for the actual cost of the work were \$100,000 and his fee were \$10,000 and the actual cost of the work were the same as the estimated cost, he would get his \$10,000.

But if the actual cost were \$110,000 his fee would automatically be reduced to \$7,500. If the actual cost should prove to be \$120,000, his fee would be cut in half to \$5,000. If the actual cost mounted to \$130,000, the provision of the contract which provides that the contractor's fee shall not be reduced more than 50% would prevent any further reduction in the fee and the contractor still would receive \$5,000. The cost to the owner in this case would be \$135,000.

Now take the case where a contractor completed the work for less than the estimated cost. Take the same contract, \$100,000 estimate plus the \$10,000 fee. If the actual cost were only \$90,000, the contractor would receive \$12,500 as his fee. If the actual cost were as low as \$80,000 he would receive \$15,000 as his fee. The

same fee would hold good if the cost were reduced as far as \$70,000.

To arrange all this is by no means as simple as it seems. In Georgia the counties are the actual road builders, rather than the state, the State Highway Department's function being largely of a supervisory character. This makes it necessary for the contractor, the State Highway Department and the county to participate in the proceedings, so the contract has to be what the lawyers call a tripartite agreement.

In the language of the contract, the county is called the "owner," the State Highway Department acts as the owner's agent in supervising the work, and the contractor acts as the owner's agent in executing it.

With these relationships established the contract then states that the owner (the county), will pay to the contractor a certain fixed sum as compensation or fee for



W. R. Neel, State Highway Engineer of Georgia, is a graduate of the Georgia School of Technology in the class of 1901. After his graduation he went to Mexico and remained there most of the time until 1916, being engaged in railroad, irrigation and engineering work. He joined the Georgia Highway Department as a highway engineer in 1917 and was made State Highway Engineer of Georgia in 1918.



the services rendered by the contractor whereby the county receives the benefit of the contractor's business system, purchasing facilities, engineering skill and experience, ability to equip, to organize with skilled foremen and laborers and includes the use of the contractor's equipment, tools, etc. A list of the equipment which he intends to use is attached to his bid by the contractor.

Then the contractor figures out his unit costs on all of the items entering into the job, such as clearing, earth excavating, concrete work, etc., etc. These various unit costs are lumped and the total is called the cost of the work. That is the figure the contractor tries to beat in order to get his extra compensation, knowing, however, that if he exceeds it he will lose at worst only half of the amount previously named as his profit.

"At worst," is not quite correct in the last sentence of the preceding paragraph. There is a condition under the contract where the contractor can be in a worse fix than losing half his profits. That is where he so mismanages the work, that in order to protect the county, the State Highway Department is forced to step in and take over the job. As it is worded this provision of the contract seems to give the State Highway Department almost arbitrary power, but there seems to be no other way to protect the public, for whom all three parties to the contract are really working. If the State Highway Department conducts itself fairly and squarely, no fair and square contractor will suffer. And if the department is not fair and square, the sooner that fact is discovered the better for all concerned. This clause of the contract will prove that point one way or the other.

Payment is made by the county as the work progresses on monthly statements of items included in the cost of the work, duly approved by the State Highway Department. If, as the job goes on, it becomes evident that changes in the specifications are necessary or decreased or increased quantities of work must be handled

such changes, when approved by the State Highway Department, shall not count against the contractor when the actual cost is figured. The usual clauses in regard to liability insurance, etc., are included.

That is how the contract reads. How is it to work? There are three factors that must be considered in awarding jobs under it.

The total amount of the bid, which will be the estimated cost plus the estimated profit, or "contractor's fee," as it is called in the contract, is the first factor. Of a total of 100 points, this item of total cost should be figured as about 65.

Then comes the experience of the contractor, his financial backing, his records on other jobs, all of which he is required to set down in a schedule which is attached to the contract. The total of these items should count about 20 points.

That leaves the question of his equipment to count the remaining 15 points. His statement is checked up and the efficiency of his equipment on the job he is bidding on estimated. Big and unsuitable equipment for a small job will count no more than too small a plant for a big one. The contractor will find that he will have to confine his bidding to jobs which he is properly equipped to handle.

Price, 65%; experience and financial backing, 20%; equipment, 15%, is a fair approximation of the values which the State Highway Department will put on these three factors in awarding jobs.

No one expects this contract to work perfectly in every case. No man-made plan ever did that, and none ever will. But it will protect the efficient contractor with a good record behind him, and a good plant with which to build roads. These are the men whom Georgia wants to build her roads, and when she gets them working for her and with her, she wants to protect them. That is what Form B is for.

## ROAD CONSTRUCTION IN ILLINOIS DURING 1919

By B. H. PIEPMEIER

Engineer of Construction, Illinois Highway Department

**D**URING 1919 there were 685.39 miles of federal aid and state aid roads placed under contract in Illinois. In addition there were 6.44 miles of roads carried over from 1917 and 1918, making a total of 691.83 miles placed under construction in 1919.

There were completed during 1919 247.24 miles, or 36% of all work. The accompanying chart clearly shows when the work was placed under contract and the construction progress. A careful study of the chart shows that a great many more miles could have been completed had the work been placed under contract at an earlier date. There were several other outstanding causes that delayed the work.

It will be noted that the maximum mileage per week was not reached until the month of October. This delay in reaching the maximum output per week was caused by the inability of the contractors to obtain road equipment. Many of the contractors were delayed from 3 to 4 months in getting proper machinery. Delays on account of machinery repairs also were serious.

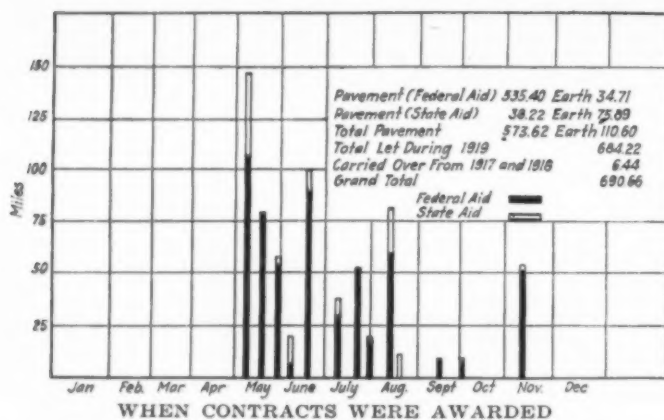
The next most serious cause of delay was shortage

of material. Much of the equipment was working but half the time on account of material shortage. Labor shortage and labor strikes in various divisions of work seriously delayed the delivery of materials and the progress of the work. About the time that the maximum amount of work per week was reached it was suddenly stopped by winter weather. Had the construction season been two months longer fully 100% more work could have been finished.

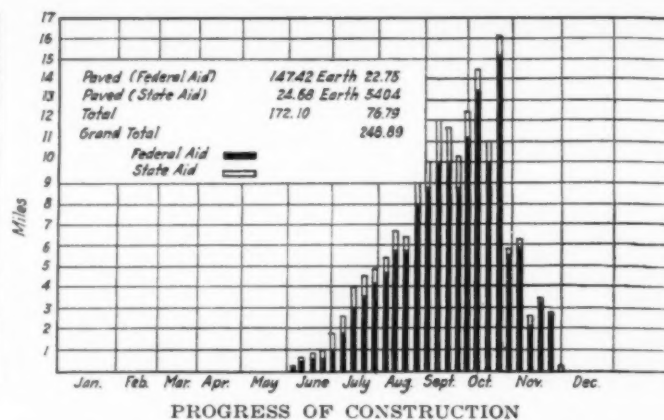
The slow progress of the work in 1919 could in no way be charged against the contractors. They as a rule exerted every possible effort to execute their work. It seemed that every change in conditions resulted in a disadvantage to the contractors. In many instances the contractors who exerted the most effort or tried to produce the greatest mileage, got the least results.

On account of the unfavorable conditions existing during 1919 the contractor who organized and planned to do a large volume of work produced much less in proportion to their investments and efforts than the man that operated the smaller unit. It was almost impossible





to work the larger units to their capacity on account of the shortage of labor and material. The smaller units were worked to their capacity a very large part of their



time, hence proved to be more economical. The larger units have their many advantages and under normal conditions will undoubtedly prove their economy.

## DREDGING WITH A STEAM SHOVEL

**A. G. TOMASELLO & S O N**, Contractors, Gibson St., Dorchester, Mass., had a contract for widening and straightening a narrow and shallow creek at Newton, Mass. Excavated material was to be piled on banks and the water was not deep enough for the usual dredging machinery so a small revolving steam shovel of 1-yd. capacity with combination boom and shipper shaft mechanism was used.

The shovel weighed about 25 tons and the creek bed was soft so it was necessary to operate from a platform giving a firm footing. This platform was made sectionally of heavy timbers of such size, weight and thickness that the truck wheels were clear of the water and ample bearing provided to sustain the weight of the shovel and to prevent the platform from sinking into the soft mud.

To get water for the boiler a hose line was run upstream about 100 ft. and water was syphoned directly from the creek. At this distance the water was clear and unaffected by the digging. In moving forward the shovel laid its own platform as shown in the illustration. A chain was passed around the boom just behind the dipper and



MOVING ITS PLATFORM

made fast to a section of the planked platform which was then swung around in front and placed. The shovel then moved forward far enough to free the next section of the platform which was transferred by the same method.

This scheme worked very successfully and the entire job was performed economically with a minimum of lost time in moving the shovel.

### HERE'S THE ANSWER

In the March issue of **SUCCESSFUL METHODS** there appeared a picture of a horseshoe imbedded in a tree with a caption under it, "How did it get there?" One of the readers of the magazine, Henry Newhall, superintendent of the Danvers Waterworks, Danvers, Mass., comes right back with the following explanation. It sounds like a good one.

"That is easy," he says in answer to the question. "You will find in the country that it is a common practice to drive a horseshoe into a tree to hitch horses or clothes lines to.

In time the tree grows over it. I know of at least two cases where wood choppers discovered such horseshoes in trees by striking them with an ax."

## A PAVING BRICK CHAMPION



John Martin of Grafton, W. Va., Who Lays 6,000 Bricks Per Hour

**W**EST VIRGINIA, which gave America her first brick street pavement, now claims to have the world's champion paving brick layer. He is John W. Martin, a negro, 34 years old, of medium height, and weighing about 130 lbs. He has had 15 years' experience.

On the Prunytown Pike, near Grafton, W. Va., under the supervision of J. A. Sincel, Taylor county road engineer, this man has consistently made the following records: He laid 600 lineal ft. of 16-ft. brick road in 8 hours. In doing this he placed 42,000 bricks, weighing  $10\frac{1}{2}$  lb. each, or a total of 200 tons. He was served by 22 Industrial School inmates, carrying brick, and 8 laborers plac-

ing brick on carrying boards. On Armistice Day, working on a street in Grafton and limited by lack of sufficient carriers, he placed 15,000 bricks in 2 hours and 40 minutes. He can at any time place 90 bricks in 30 seconds.

So great has become the grip of his hand that he can lift a stack of nine bricks, weighing 94 lb., by grasping the lowermost brick of the stack.

The statements here made are vouched for by W. S. Downs of the State Highway Commission, and by B. E. Gray, Federal Highway Engineer, who took the accompanying photographs. Does any contractor know of a better record?

## LAYING INDUSTRIAL TRACKS

**T**HE worth of industrial track was proved by the service which it lent to the A. E. F. Engineers who had charge of transportation operations in France report that it did even more than was expected of it.

So much was it depended upon that the methods of laying and operating it usually consisted of throwing it down on the roughest kind of ground, dry or swampy, and beginning to run heavy loads over it without delay. War conditions created one long emergency that never ceased.

In the more settled conditions which obtain in highway building over here, a few simple rules in regard to

the laying of industrial track can be followed easily and if they are kept in mind the results will more than justify the pains taken.

The road should be graded to its full width as called for in the cross sections. When this grading is completed it should be dragged with a grader, then rolled, and again bladed to take out the short choppy rolls caused by the roller. Pressed tie track laid on this prepared road bed will imbed itself, hold its alignment, have solid bearing under all ties and permit faster speed of trains without accident. Best of all, it will require practically no maintenance expense.



# PORT DEVELOPMENT AT PORTLAND, OREGON

## New Municipal Terminal to Handle Grain Is Nearing Completion

By G. B. HEGARDT

Chief Engineer, The Commission of Public Docks

**D**URING the last six or seven years the Pacific coast has witnessed a concerted and enormous growth in port development, large sums having been expended by the major ports in the provision of modern facilities for the handling of its rapidly expanding water-borne commerce. Practically all of this terminal work has been done by the municipalities of the various port districts, construction by private interests having been exceedingly small.

Since 1913, when the Commission of Public Docks, the official body charged with the reconstruction of Portland's water front, entered the field as a municipal agency to provide most modern and efficient shipping facilities for the port, the people have voted the sum of \$10,500,000 for such work, \$8,000,000 of which was made available during the last two years. Three terminals for the handling of general cargo, with a berthing length of 2,505 lineal feet and a combined cargo capacity of 35,000 tons, were constructed and placed in operation more than three years ago, before the country entered the war.

As it was evident that the old custom of exporting the grain crop produced in the port's tributary territory in sacks, was soon to be discarded and the universal method of handling it in bulk instead would soon have to be adopted, the Dock Commission, after an extended investigation, determined to construct modern elevator facilities to meet this new condition of handling grain, and at the same time decided to concentrate at this new terminal, as far as practicable, its main facilities for the accommodation of the port's principal import and export business and to obtain, for that purpose, a site of sufficient area to permit also of future expansion requirements. The site selected has an area of 153 acres and a harbor frontage of 2,500 lineal feet, with sufficient depth of property to permit of most excellent trackage connections to the grain elevator, the piers and the industrial section, which contains approximately 50 acres. This terminal, designated as the Portland Municipal Terminal No. 4, is served by the Union Pacific, Northern Pacific, Southern Pacific, Great Northern and the Spokane, Portland and Seattle railroads. They will keep it busy.

Pier No. 1 of Portland Municipal Terminal No. 4 has a total length of 1,500 feet and a width of 225 feet and on this has been constructed a transit shed 180 feet in width for the full length of the pier. Pier No. 2,

which is now nearing completion, is also 1,500 feet long and 225 feet wide, but as yet, no transit shed has been constructed thereon, but such construction will be undertaken in the near future.

The grain elevator will soon be completed and ready for operation. The site of this terminal, which as already stated, contains 153 acres, was subject to overflow from freshets in the Columbia and Willamette rivers, and for this reason it was necessary to deposit thereon a large amount of material to raise it to an elevation above flood stages in the river. When this site was acquired it was estimated that it would require 4,000,000 cubic yards to raise it to the desired elevation and most of this material was to be obtained from channel dredging in front of this



THE 1,000,000 BUSHEL ELEVATOR THAT IS PART OF PORTLAND'S NEW MUNICIPAL TERMINAL.

terminal, and also from the excavation of the three slips which serve the five piers of this terminal. To date, approximately 3,500,000 cu. yd. of material have been so placed that at this time practically the entire site has been raised to the required elevation.

The Port of Portland, also a municipal body, has performed the channel dredging and the depositing of the material on the site free of cost to this commission, one of the functions of the Port of Portland being to provide proper channel conditions for any water front improvements of the harbor. The cost of excavating the slips, however, has been borne by this commission, and the total amount of material removed from the slips and to be removed therefrom amounts approximately to 1,300,000 cubic yards.

In the construction of piers Nos. 1 and 2 there was used approximately 12,500 piles varying in length from 50 to 95 feet, and in the construction of these two piers, including the transit shed on pier No. 1, there was used approximately 12,500,000 f.b.m. of timber. The contract price of Piers 1 and 2 and the transit shed on pier No. 1 was in the neighborhood of \$985,000.



As to pier No. 1, which was constructed in 1917 and 1918, we had provisions in our contract which protected the contractor against any increase in wages above the going scale of wages, which was in effect at the time the contract was let, and under this provision this commission had to pay a considerable amount, but it is believed that if this provision in the contract as to increase in wages had not been a part of the contract, the contractor's bid would have been far in excess of that submitted, as the uncertainty as to wages would naturally have compelled the contractor to "play safe," and in order to protect himself, would have increased his bid much beyond the amount which this commission had to pay.

No such provision as to protection to the contractor for increase in wages was made a part of the contract covering construction of pier No. 2.

The contract price for the construction of the elevator, exclusive of excavation, pile foundation, cement, motors, belting and cleaning machinery, was \$798,383. On account of the depth to which the excavation for the elevator had to be carried, a good many difficulties were encountered in completing that work, both on account of seepage of water from the river and also because at the time the excavation work was in progress we also had filling operations under way which also brought a lot of water into the excavation. As with the pile driving of Piers 1 and 2, the driving of piles for the elevator foundation was completed without any serious interruptions.

The contract for the elevator construction contained the following clause:

"This contract is based in part (a) upon the cost of local labor at the site; (b) upon the basic cost of pig iron, sheets, plates, shapes, shafting, brass and babbitt which will be fabricated for use in the structure; (c) upon the cost of labor of fabricating the same; (d) upon the cost of freight for transporting the fabricated products."

In this contract the going scale of wages in effect at the time bids were invited was stated, and as in the case of pier No. 1 the Commission guaranteed the contractor against any advance in wages above the going scale given in the contract forms, this Commission paid a considerable sum in addition to the contract price of \$798,383.

I may state here that in any work undertaken after the contracts were let for pier No. 1 and the grain

elevator, no provision has been made in our contracts to pay any increase in wages which might occur during the construction and completion of such contracts.

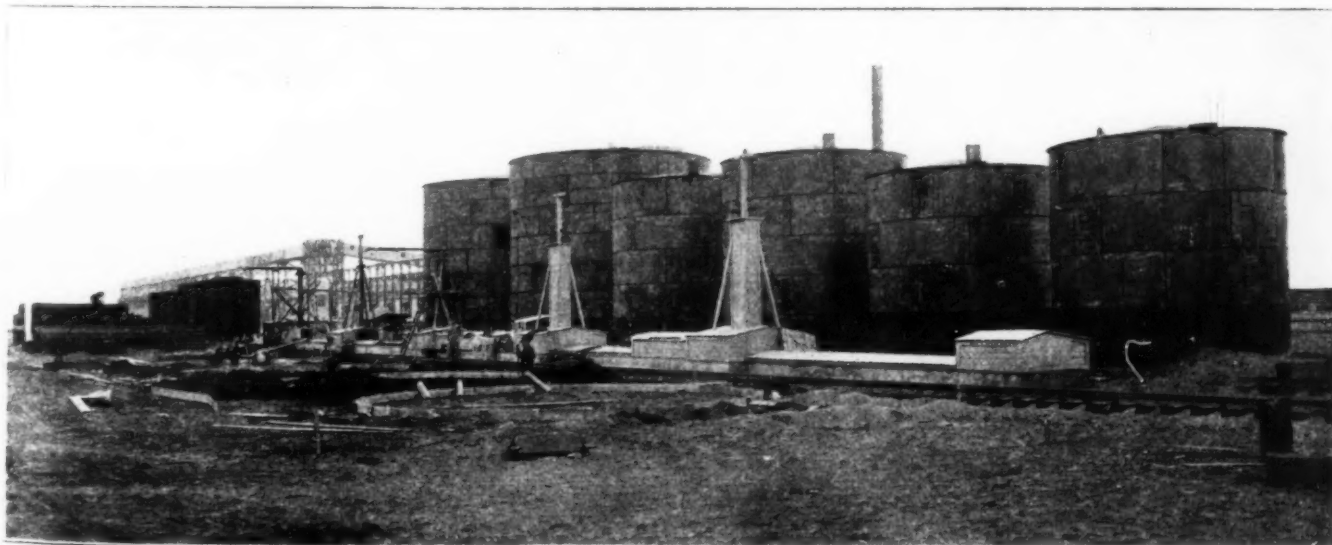
Owing to the fact that we have in our tributary territory a large number of grades and varieties of wheat it was necessary to design the elevator entirely different from the usual type used by tidewater terminals on the Atlantic coast, and we, therefore, put in a large number of bins in the operating house in which we could handle and store the usual grades and varieties of wheat previous to it being cleaned and placed in the storage bins. This also necessitated the installation of extra legs for the handling of clean wheat and smutty wheat. At this elevator we can take wheat at the rate of 100,000 bushels in eight hours and can deliver bulk wheat to vessels at the rate of 20,000 bushels per hour.

At this terminal we already have laid about eight miles of tracks, and when the entire terminal is completed we will have approximately twenty miles of tracks for the storage and distribution of cars to the piers, elevator and industries located on this terminal. This complete trackage will enable us to handle at this terminal at one time approximately 1,000 cars.

The steel tanks now constructed and in operation at this terminal for the handling of vegetable oils and molasses have a capacity of 16,000 barrels, and five additional tanks are now being installed with a capacity of 10,000 barrels. In connection with these storage tanks we are installing a complete system of pumping mains, compressed air, hot water and steam pipes for the proper handling of vegetable oils and molasses.

For the accommodation of the terminal we have constructed an administration building, a cafeteria seating 200 people and a welfare building with shower baths, lounging rooms, etc.

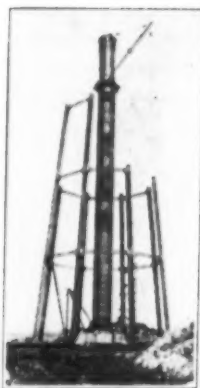
At Municipal Terminal No. 4 there has been provided a self-contained, combined rail-and-water terminal of great flexibility and expansive possibilities, where all services incident to terminal operation can be performed with economy and dispatch, where ample space will be available for the accommodation of all classes of cargo, under shed or for open storage, without congestion, and where future requirements will be anticipated.



SIX STEEL TANKS FOR STORING VEGETABLE OILS AND MOLASSES. FIVE MORE ARE BEING BUILT AS PART OF THE EQUIPMENT OF MUNICIPAL TERMINAL No. 4.

## BUILDING A STEEL SURGE TANK

Part of Permanent Structure Used as Mast During Construction Work



THE large tank shown in the illustration was erected at Colton, N. Y., by the Chicago Bridge & Iron Company, under all of the attendant difficulties of winter. It is a differential surge of the Johnson type and the unusual methods employed in its erection make it an interesting example of the flexibility of design possible of attainment in these large steel towers.

From the base of the tower to the top of the shell is 258 ft.; the cylindrical part of the shell is 56 ft. high, while the tank itself is 50 ft. in diameter.

The external riser which connects the bottom of the tank with pipe line is a fair-sized standpipe alone, being some 12 ft. in diameter and 180 ft. high. A structurally reinforced steel tee forms the connection between the pipe line and the riser and is encased in concrete. Each of the four sections forming the eight posts supporting the tank are more than 50 ft. in length. Extending from the bottom of the tank to within 3 ft. of the top—a distance of some 78 ft.—is an internal riser which communicates with the tank proper by means of suitable differential ports or holes.

When the tower was erected the external riser was put up first and also the lower half of the internal riser. This portion of the internal riser was then used as a mast: the lower end of a boom was fastened to the roundabout angle at the top of the external riser by means of a special cast steel pivot casting, forming a universal joint which permitted the boom to swing from one position to another. The small photograph at the top of the page shows the connection of the fall line and boom to top of the internal riser by means of blocks.

The lines were carried

down inside the risers to the hoisting engine on the ground and by this arrangement it was possible to erect the entire tower, simply by moving the boom 180 degrees around the riser twice. The top and bottom sections of the tower each weighed more than 12 tons. A special bail so made that when a section of post was lifted it would hang at the same level as the tower, facilitated the landing and bolting up at the panel points.

After the tower was raised the boom was used in raising the tank shell, bottom plates and internal balcony struts which came at the spring line. In the small photograph the boom is in such position that the fall line is over 2,700 ft. long.

The bottom tower post was designed to carry a load of 1,382,000 lbs., having a section of 105.5 sq. in.; while the top post is designed to carry only 1,150,000 lbs. and has a section of 87.5 sq. in. This reduction in section is accomplished by using thinner angles and web plates at the top.

The various conditions of loading of the three 1,100 hp. vertical turbines in the adjacent power house makes necessary the reinforcing of the internal riser against alternate internal and external pressure, for at times the water in the riser pipe drops down near the bottom when the tank itself is nearly full, and vice versa. So too the shell of the tank is at times subjected to an internal vacuum and to overcome this the shell plates were reinforced with 10-in., 20-lb. channels to resist a pressure of 15 lb. per square foot. Air traps in the roof also aid in overcoming this internal vacuum. Thus in spite of the various possible maximum loads of the various members the construction is such that they are each stressed only to the allowable unit stresses.

The erection of such a tank during the winter in the northern part of New York where the average temperature is pretty low, was no easy task. Despite this handicap the work was prosecuted by the contractors without serious delay.



THE TANK NEARING COMPLETION



## A SPACE ECONOMIZER

### Tower for Chuting Concrete Tucked Away in Elevator Shaft

By R. C. CORNELISEN

**A**N ingenious method of keeping a tower for chuting concrete where it would be least in the way was adopted by the Texas Company recently. The plans for the building, a four story and basement affair, included a small elevator shaft, so the tower was put up in it as shown in the photograph.

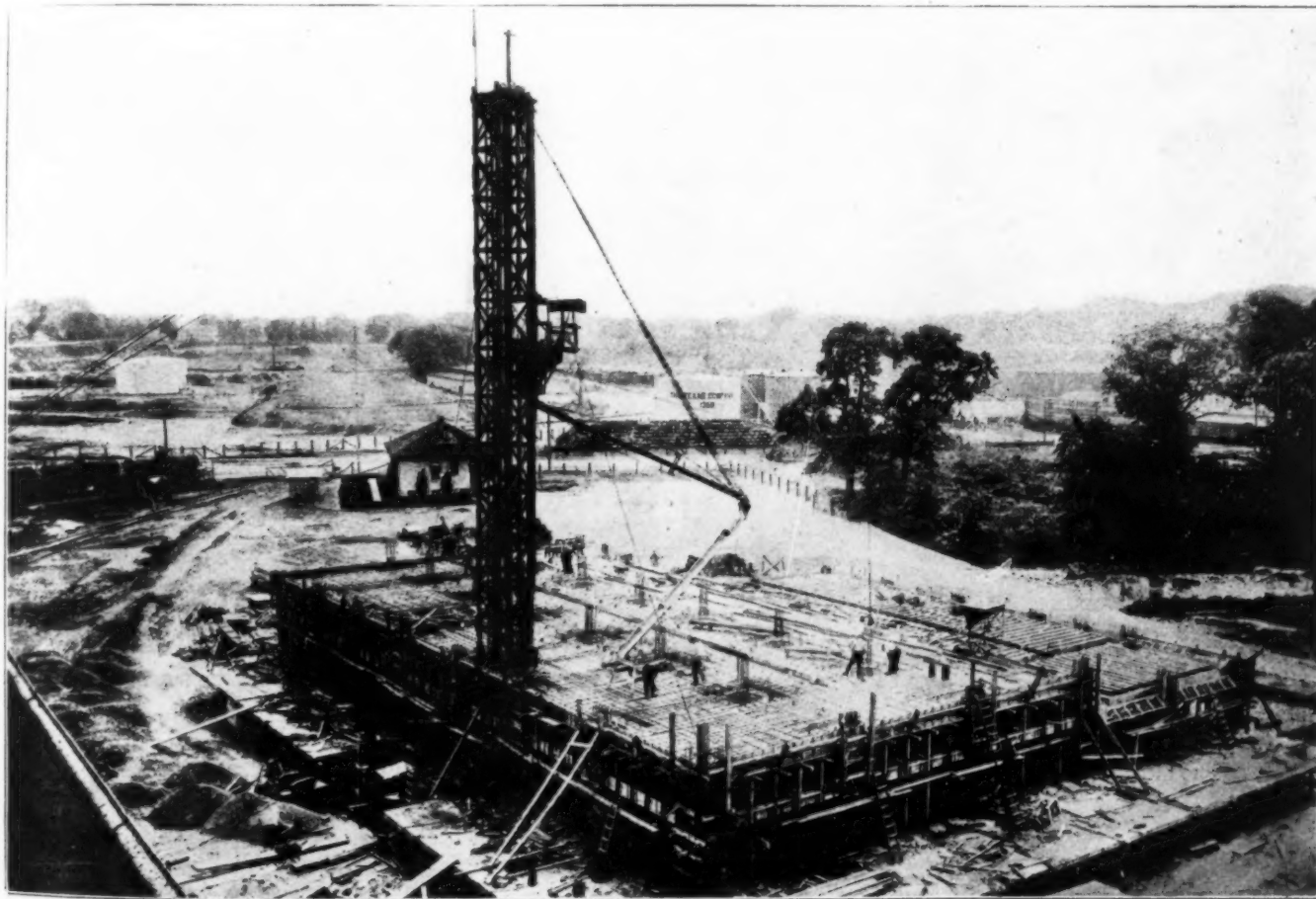
The place selected by the architects for the elevator was close to one wall of the building and equidistant from the ends. Its proximity to the side of the building made it easy to get at the mixer without going inside the structure. The material piles may be plainly seen at the left side of the photograph close enough to the mixer to be transferred with little difficulty. Every effort was made to do the job with as great an economy of effort as possible and the entire layout was planned with this end in view. A more detailed description of the method of chuting and placing the concrete follows:

The mixer was set in the basement, so as to discharge into the elevator bucket and yet be low enough so that material could be dumped into a loading hopper from the ground level. The hoist engine was set clear of the building so the engineer had full view of the bucket.

Sand and stone were dumped within 10 to 100 ft. of the mixer. When using material within 40 ft. of the mixer, wheelbarrows were found best. As soon as a greater distance had to be covered, dump cars of 18 cu. ft. capacity, running on industrial track, were found to be more economical.

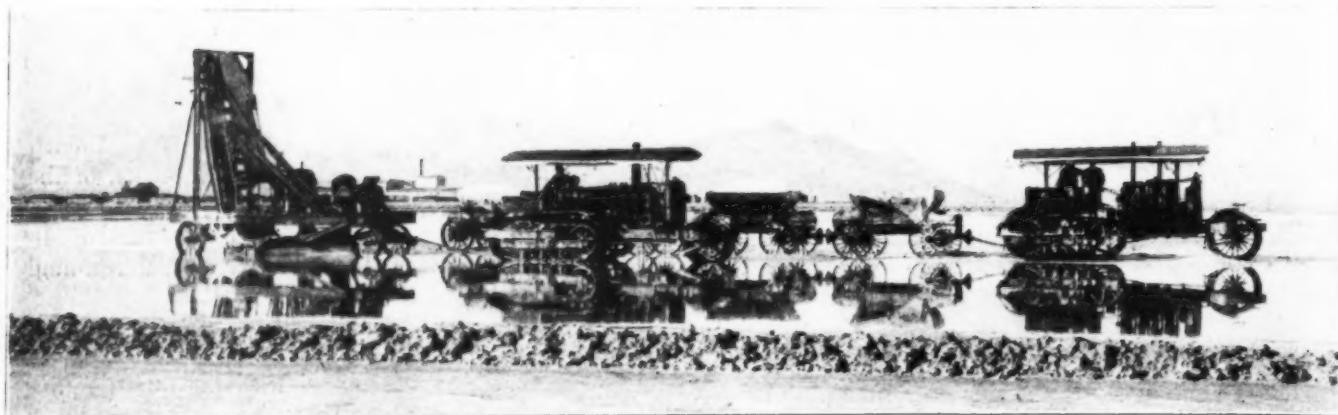
The largest day's work was 120 cu. yd. of concrete placed in 8 hr. The average 8-day run was 100 cu. yd. Most of the concrete was placed with the 60 ft. radius plant consisting of a 30 ft. boom section with a 30 ft. plain chute section attached. In some parts of the work it was necessary to put a horse under the end of the 60 ft. plant and run 10 to 20 ft. lengths of light chute out from this point, to the outer parts of the building. At several times the concrete was chuted to the floor hopper and carted to the far ends of the building. These slight changes in method made necessary by the distance between the tower and the furthestmost parts of the structure were accomplished with little difficulty. The building contains about 2,200 cu. yd. of concrete.

The mixer, cars, chutes, tower equipment and concrete carts used on this job were also used successfully on the construction of two other buildings for the Texas Company.



GENERAL VIEW OF JOB SHOWING TOWER PLACED IN ELEVATOR SHAFT.

## SALT HARVESTING WITH MACHINERY



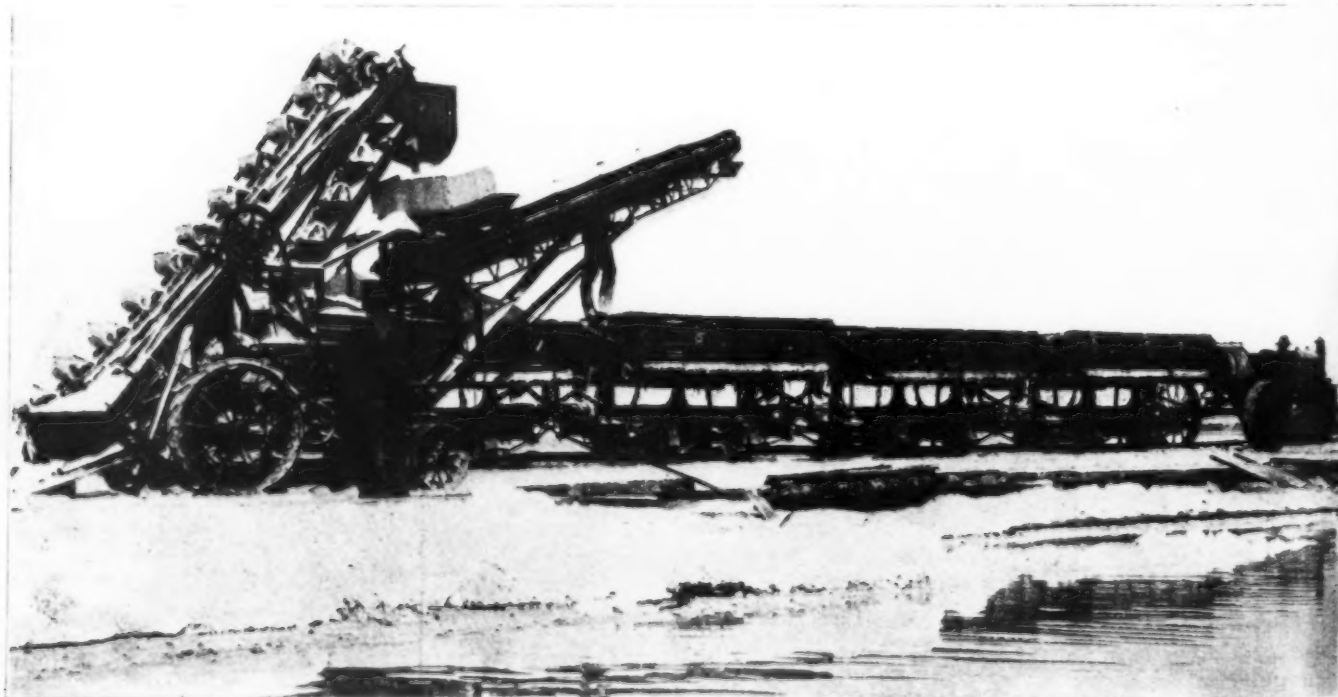
SALT HARVESTING MACHINE AT WORK PLOWING UP SALT AND GATHERING IT INTO BUCKET LOADER  
IN THE GREAT SALT FIELDS OF WESTERN UTAH

**M**ODERN machinery is playing its part in the harvesting of salt in the great salt fields of Western Utah. The photographs on this page show some of the operations on the property of the Utah Salduro Company of Salduro, Utah, a town about 150 miles west of Salt Lake City and within 10 miles of the Nevada-Utah boundary.

A vast salt deposit varying from 2 ft. to 15 ft. in thickness and covering an area of about 25 miles square is being worked by the company. The salt is loosened by a salt harvesting machine, which operates on much the same plan as an ice plow and plows up the salt to a depth of about 1 in. This machine also gathers the salt into a bucket conveyor which elevates it into a screen and then dumps it into 5-ton wagons. The wagons take it to the side of a small industrial railway, where it is dumped on the ground and allowed to dry in the sun.

After it is dried bucket loaders pick it up, load it into small industrial cars and it is taken to the refining mills. A large refining mill for the making of table salt recently has been put in operation.

About 150 to 250 men are employed on the project. The company has several large mills and a number of attractive bungalows, all of which are built on the surface of the salt beds. As there is no soil in sight for miles around, the whole surface of the ground is a dazzling white and must be seen to be appreciated. At present much of the salt is used for stock feed and large quantities are shipped to smelters for fluxing. The supply seems almost inexhaustible and it is possible to turn out any kind of salt desired by the installation of proper refining mills. The utilization of up-to-date machinery in this industry has caused an enormous increase in the output in Utah territory within the last few years.



BUCKET LOADER DUMPING DRY SALT INTO SMALL INDUSTRIAL CARS



# The World-Wide Guide to the Best Construction Machinery and Service



## Truly International

**W**HAT a vast difference there can be in the distribution of construction machinery!

One method—the usual one—to merely “sell” the machinery through a “desk jobber” and let the purchaser struggle alone as best he can.

The other—to *be on the ground*. Experts in every phase of the sale, distribution and employment of the machines at the users door, the world over—no matter what his location.

Such an organization is this. From Europe's capitals to the Orient's outposts—everywhere construction machinery is used—you'll find the Allied mark and Allied service.

Note the scope of this organization as shown by the branches listed here. It is a truly international world-wide service.

### ALLIED MACHINERY COMPANY OF AMERICA

Cable Address: ALMACOA

51 Chambers Street — New York

#### Branch Offices:

ARGENTINA—Venezuela, 691 J. A. Cordal, Buenos Aires. Cable Address: ALMACOA

AUSTRALIA—Sydney, A. N. Herrick, 76 Pitt Street. Cable Address: CONALMAC

BELGIUM—Brussels, Allied Machinery Company of America, 34 and 36 Rue Melsens. Cable Address: ALMACOA

BRAZIL—Sao Paulo, Byington & Co. Cable Address: ALTON

CHILE—Iquique, Allied Machinery Company of America. Cable Address: ALMACOA

CHILE—Santiago, Allied Machinery Company of America, Calle Bandera 780. Cable Address: ALMACOA

CHINA—Tientsin, French Concession, Horne Co., 35-37 Rue de Baron Gros.

CUBA—Havana, Allied Machinery Co. of America, Obrapia 23. Cable Address: ALMACOA

ENGLAND—London, Allied Machinery Co., Limited, 132 Queen Victoria Street, E. C. 4. Cable Address: ALYDMACHIN

FRANCE—Paris, Allied Machinery Co. de France, 19 Rue de Rocroy. Cable Address: ALMACOA

INDIA—Karachi, Allied Machinery Co. of America, P. O. Box 4. Cable Address: ALMACOA

ITALY—Turin, Allied Machinery Company d'Italia, Corso Dante 40. Cable Address: ALMACOA

JAPAN—Tokyo, Horne Company, Ltd., 67 Takiyama cho, Kyobashi-ku. Cable Address: HORNE

PERU—Lima, Representative, Joaquin M. do Uriarte, Engineer, Cor. Ortiz and Calonge Streets

PORTUGAL—Lisbon, Moteiro Gomes, Ltd., Rua do Alecrim 10. Cable Address: TRACTORS

SPAIN—Barcelona, Allied Machinery Co., S. A. E. Plaza Cataluna 8. Cable Address: ALMACOA

The export business of the non-competing manufacturers whose advertising appears in this magazine is handled by the Allied Machinery Company of America.



## Are Your Shovels Orphans?



1.  
Here's an "orphan" all dressed up  
— brand new. See the "pretty"  
paper label.



3.  
After 3 months service this orphan  
is ready for the junk pile. Can you  
remember back three months to  
those "pretty paper labels?" If  
you can't, you're out of luck.  
One thing is sure. There is no  
way to identify it now, and no one  
will admit parentage. It's an or-  
phan. Are your shovels "orphans?"

**D**OES anyone stand back  
of them — or are they  
nameless vagrants?

"Orphans" are shovels afraid  
to tell their maker's name.

These are the questions for you—  
"Who makes my shovels?"

"To whom can I turn if they fail  
to pay their way—to give service?"

"Orphans" belong to no  
one. Beware of them.

**THE WYOMING  
SHOVEL WORKS**

WYOMING, PENNA. U. S. A.



### THE WYOMING SHOVEL WORKS Wyoming, Pa.

NEW YORK	CHICAGO	BOSTON
141-149 Centre St.	347 Peoples Gas Bldg.	118 Pearl Street
PHILADELPHIA	ATLANTA	
1234 Commercial Trust Bldg.	810 Candler Bldg.	
SPOKANE	SAN FRANCISCO	
336 First Avenue	268 Market Street	



# *The* WYOMING SHOVEL WORKS



## The Only Time a Trademark Counts

A TRADEMARK which isn't lasting means nothing. The time you want to know who made your shovels is when they've been in service. Then—and then only—can you know how good they are. You don't want "orphans" then. *You want to know their pedigree.*

We are not ashamed to tell you Every Wyoming Red Edge carries its name forever.

This mark is your protection. Look for it.

THE WYOMING  
SHOVEL WORKS

WYOMING, PENNA, U. S. A.

WYOMING  
RED EDGE

2.

And a close up. Here's the name Wyoming indelibly branded into the steel. Use it a week—a month—a year. Yes, a lifetime. It's a Wyoming. No question about it when it is marked like this.

3

3.

Wyoming Red Edge Shovels are the best that money can buy. Note how slowly and evenly this blade wears back after long usage. Our special alloy steel gives this long service. From tip to handle, Wyoming Shovels are specially made to *last*. They do it, too. And that's why we are not afraid to own them, ever. A Wyoming or an Orphan. Which sounds better to you?

1.

A new Wyoming. See the Red Edge for easy identification at a glance.

EXPORT DEPARTMENT  
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA  
51 CHANDLER ST., NEW YORK, U.S.A. CANADA: ALMACOA, NEW YORK

# The WYOMING SHOVEL WORKS





## Immediate Delivery of Lakewood Universal Mixers

**I**MMEDIATE delivery is practically a thing of the past. One of those things that we used to know in the so-called "good old days".

But in spite of delayed shipments of steel, we have anticipated your need for small mixers—another example of Lakewood Service. We have, in stock, for *immediate delivery*, a quantity of Lakewood Universal Mixers.

This one bag machine, mounted on trucks, with low charging platform and gasoline power, is a sturdy and easily portable mixer for all-round use. Capacity 7 cu. ft. of mixed concrete.

Its popularity has been earned by the ability of the Universal to turn out the work. It's small enough to be moved easily—large enough to turn out a big yardage per day.

Our contractor friends frequently call it the "Ford of Mixers". Probably because it's always on the job—ready to go and keep going.

And the price is \$655 F. O. B. Chicago Heights, Illinois. You can get *immediate* shipment *now*.

### OFFICES AT

New York City, Boston, Richmond,  
Philadelphia, Washington, Buffalo,  
Atlanta, Pittsburgh, Minneapolis,  
Cleveland, Detroit



Milwaukee, Chicago, Des Moines,  
Kansas City, St. Louis, Portland,  
Houston, San Francisco, Los Angeles,  
Dallas, Seattle



THE LAKEWOOD ENGINEERING COMPANY, CLEVELAND, U. S. A.

Makers of

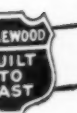
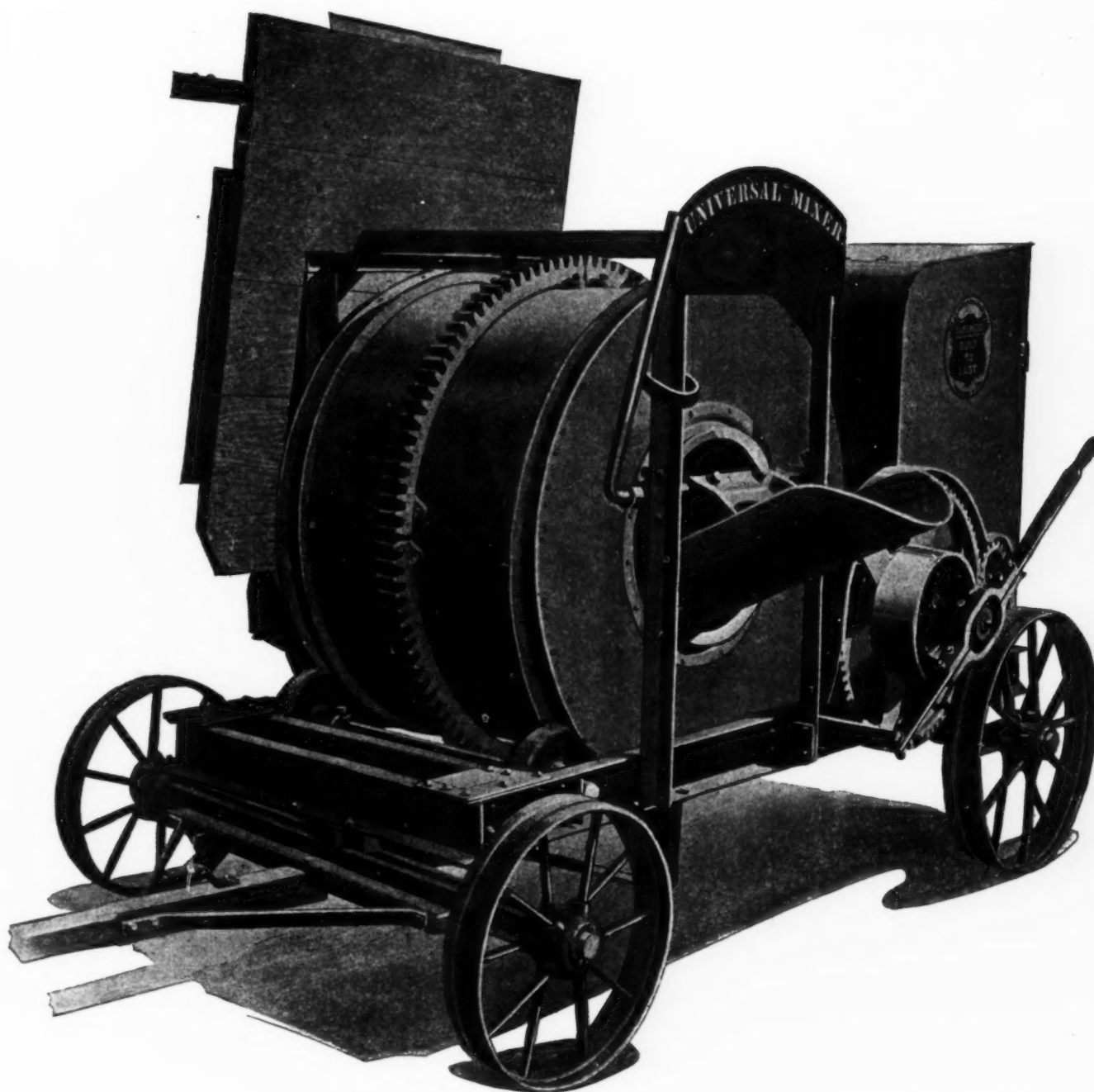
Lakewood Industrial Haulage Equipment

# Lakewood

## Construction Plant







THE LAKEWOOD ENGINEERING COMPANY, CLEVELAND, U.S.A.

Makers of

Lakewood Industrial Haulage Equipment

**Lakewood**  
Construction Plant





# An Increase in

*But an Analysis Shows that Increased  
Six Years is Less Than the*

**L**AKEWOOD prices were increased April 1st. But taking the prices of a Lakewood-Milwaukee Mixer in 1914 and April 1st, 1920, we find some interesting facts.

A Lakewood-Milwaukee No. 21-S Mixer with steam engine and boiler, mounted on trucks sold in 1914 for \$1300.

The same size Machine, with improvements developed during six years, is now listed at \$3325.

The increase in price of this mixer during the last six years is 155%.

Yet during this same period the price of steel billets has increased 175%. The increase in pig iron has been 244%.

The average increase in labor cost has been 133%. This includes *all* classes of labor. For most classes the increase has been *considerably more* than 133%.

#### LAKEWOOD DISTRICT OFFICES

New York City, Boston, Philadelphia, Washington, Richmond,  
Atlanta, Pittsburgh, Cleveland, Buffalo, Detroit, Milwaukee,  
Minneapolis, Chicago, Kansas City, St. Louis, Des Moines,  
Dallas, Houston, San Francisco, Los Angeles, Portland and Seattle.



THE LAKEWOOD ENGINEERING COMPANY, CLEVELAND, U.S.A.

Makers of Lakewood Construction Plant

# Lakewood

Road Construction Plant







# in Lakewood Prices

*Increased Cost of Lakewood Equipment During the Last  
Year Due to Increases in Raw Material*

THE increase in cost of raw materials since 1914 has been greater than that in the price of the finished product. The increase in price of the product is only a little more than the *average* increased cost of labor.

Only by efficient manufacturing and careful planning has the user of Lakewood equipment been protected from still greater price increases.

Excessive gains have no part in the Lakewood plan. We *do*, however, propose to show a fair profit on Lakewood products—as assurance that Lakewood “Built to Last” quality will be maintained and that the Company continue to give its clients the same good service as in the past.

“One Price to All”—A copy of the new Lakewood price list for the period April 1st, to July 1st, 1920, will be sent on request.



THE LAKEWOOD ENGINEERING COMPANY, CLEVELAND, U.S.A.

Makers of

Lakewood Industrial Haulage Equipment

# Lakewood

Construction Plant





## *Saving \$1000 a Mile On Road Work*

**I**T IS practically impossible to finish subgrade, by hand methods, exactly to grade. The inspector won't pass high spots. Therefore, the subgrade is low. This means extra concrete to bring the finished road to grade.

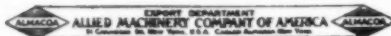
If the subgrade could be cut *exactly* to grade—and if the number of men in the subgrading crew could be reduced 50% or more—the contractor would save the cost of about 73 yards of concrete per mile *plus* 50% of his labor cost. On an 18 ft. road this saving is well over \$1000 a mile.

The Lakewood Subgrader—the latest addition to the Lakewood Road Plant—makes this saving possible. How the Subgrader cuts the subgrade to exact depth and reduces the labor cost is illustrated in a new booklet.

*Ask for a copy of "Saving \$1000  
a Mile on Road Construction".*

#### OFFICES AT

New York City, Boston, Richmond,  
Philadelphia, Washington, Buffalo,  
Atlanta, Pittsburgh, Minneapolis,  
Cleveland, Detroit



Milwaukee, Chicago, Des Moines,  
Kansas City, St. Louis, Portland,  
Houston, San Francisco, Los Angeles,  
Dallas, Seattle



THE LAKEWOOD ENGINEERING COMPANY, CLEVELAND, U.S.A.

Makers of Lakewood Construction Plant

# **Lakewood**

## **Road Construction Plant**



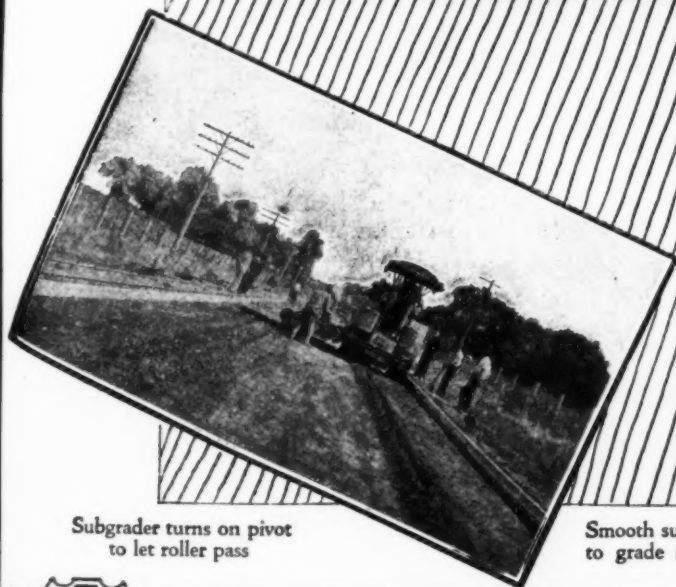
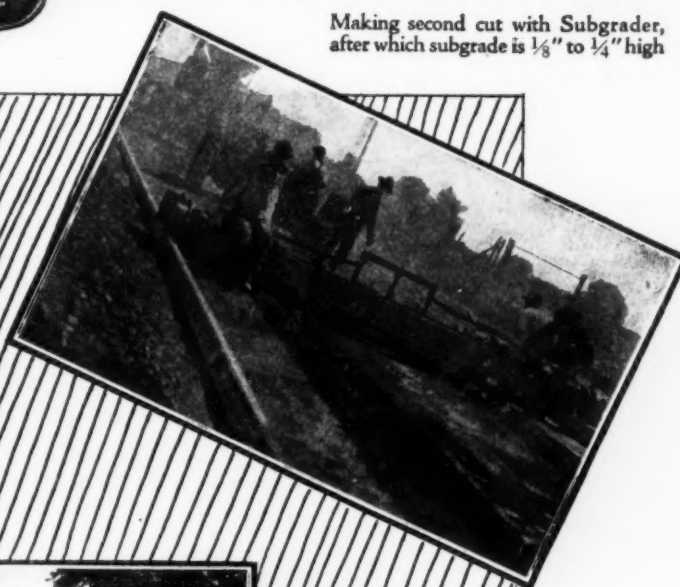




Setting forms and rolling soft earth preparatory to making first cut with Subgrader

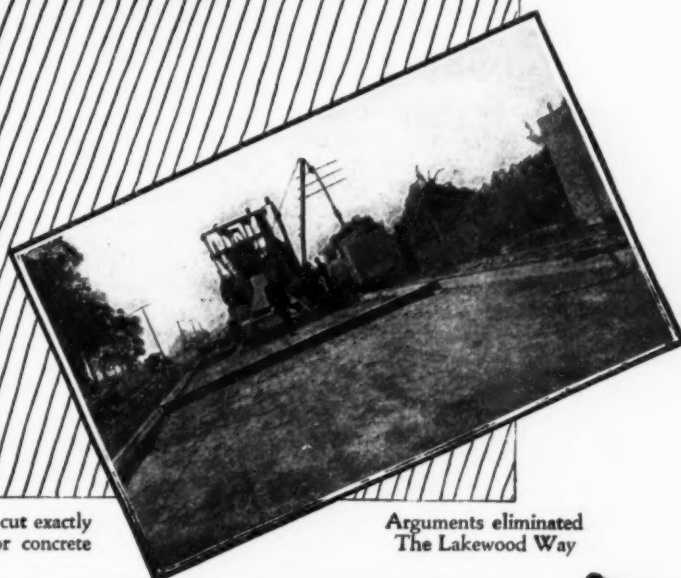


Making second cut with Subgrader, after which subgrade is  $\frac{1}{8}$ " to  $\frac{1}{4}$ " high



Subgrader turns on pivot to let roller pass

Smooth subgrade, cut exactly to grade ready for concrete



Arguments eliminated The Lakewood Way



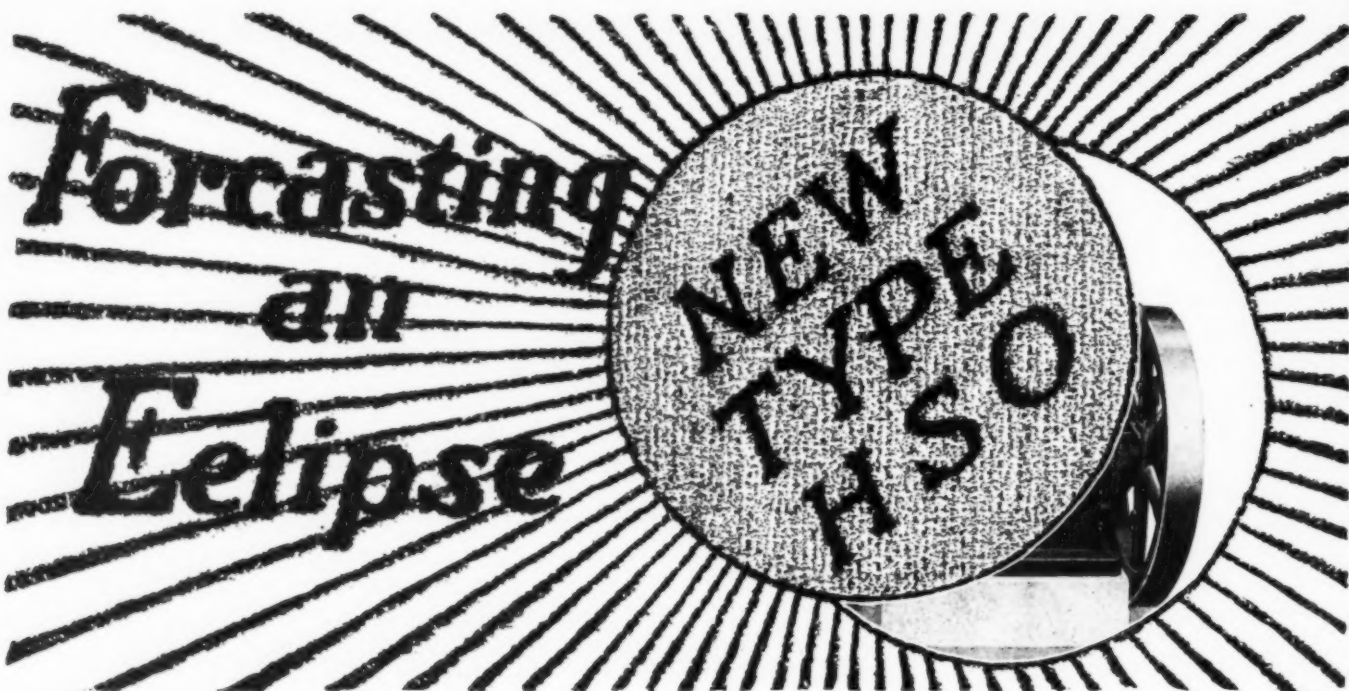
THE LAKEWOOD ENGINEERING COMPANY, CLEVELAND, U.S.A.

Makers of Lakewood Construction Plant

# Lakewood

## Road Construction Plant





Just as surely as an astronomer can forecast an eclipse of the sun, so can we look into the future and foretell the coming eclipse of all our past best efforts in engine building by our New Type H S O. We have built good gas engines in the past. Cook Engines have built up a reputation we can well be proud of. Even so, we can truthfully say that our New Type H S O will far surpass any model previously made by us. Here are some of the reasons why:

### *The New Type H S O*

- |   |  |
|---|--|
| 1—It runs on kerosene.  | 5—Forced feed lubrication.                               |
| 2—Easily started—has auxiliary gasoline cup.                  | 6—Complete high tension ignition system.                 |
| 3—Inverted type of carburetor—no flooding when running light. | 7—Hopper cooled.   |
| 4—Mechanically operated valves—both intake and exhaust.       | 8—Top and bottom halves of main bearing interchangeable. |

### *New Cook Engine Outshines All Others*

The new Type H S O will prove a rugged, reliable and economical gas engine for the contractor—or anyone—who wishes a 12 H. P. gas engine for hard, continuous, heavy-duty work.

Write for further information about this new model. Get your inquiry to us early—we are quite sure we will be unable to take care of the demand for the New Type H S O.



## Cook Motor Company

Delaware, Ohio





# Carbic

## AUTO-FEED

Of the Special Carbic Cake

### And Uniformity of Gas Pressure

Are only two of the many good reasons why hundreds of contractors are using

## CARBIC LIGHTS

Consult the diagram—the water touches only the bottom of the lowest cake. If the valve is closed, the generated gas depresses the water and “gas making” absolutely stops. When valve is open, the water rises again to the bottom of the cake and “gas making” goes on.

No wastage—and a steady, bright light, free from smoke and soot—but why not ask for the whole story?

### Carbic Manufacturing Company

Duluth, Minnesota

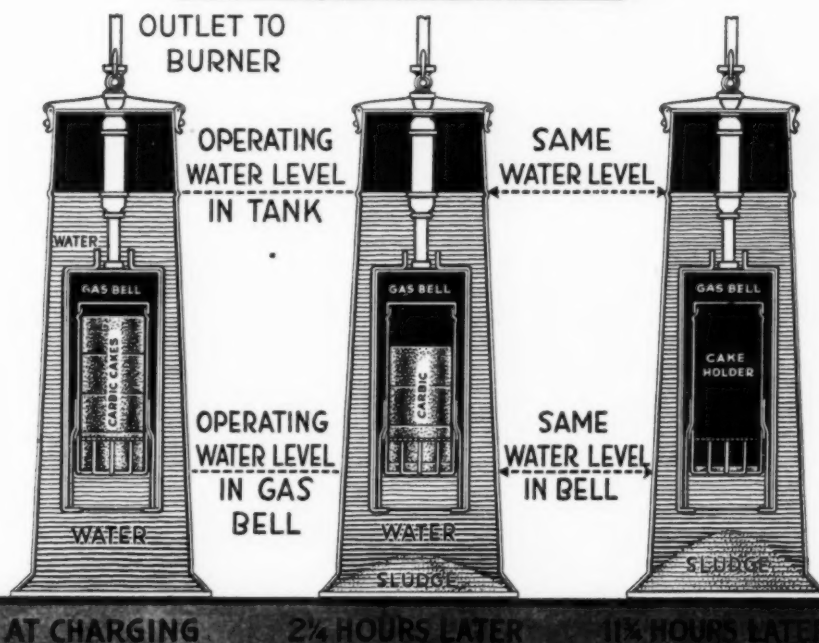
New York: 141-149 Centre Street  
Boston: 27 School Street

Chicago: 111 West Washington Street  
Philadelphia: 18 South Seventh Street

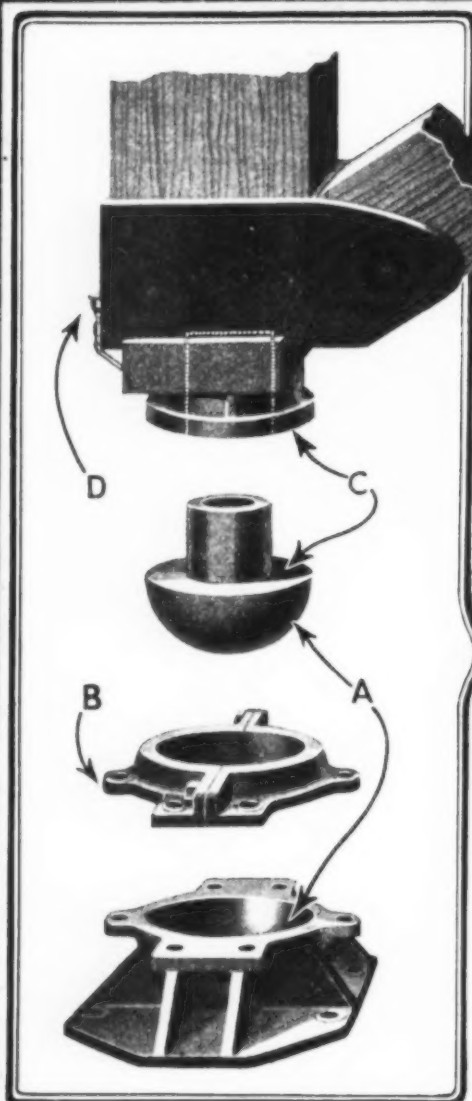
Representatives and Stocks in all Principal Cities



EXPORT DEPARTMENT  
ALLIED MACHINERY COMPANY OF AMERICA  
31 Chambers St., New York, U.S.A. Cable: ALMACOA New York



THE  
**Carbic**  
SYSTEM



# What the CLYDE Ball & Socket Base Means to You—

"A" This double bearing ball and socket bottom permits the rubbing surfaces to adjust themselves to any tilting or swaying of the mast.

"B" Detachable flange—holds ball in socket.

"C" Mast always turns on full flat surface, regardless of angle.

"D" Grease cup.

This is only *one* of the many facts why CLYDE equipment should appeal to you. Why not ask for the complete data?

## Clyde Iron Works

Duluth, Minn., U. S. A.

New Orleans  
414-416 Carondelet St.  
Savannah  
501 Germania Bank Bldg.  
Chicago  
11 So. La Salle St.  
New York  
141-149 Centre St.  
Seattle  
542 First Ave., South  
Portland  
18th and Upshur Sts.

